

WASHINGTON STATE BUILDING CODE COUNCIL
APPLICATION FOR REVIEW OF A PROPOSED STATEWIDE AMENDMENT
TO THE WASHINGTON STATE BUILDING CODE
2012 Code Adoption Cycle

Log # _____
(office use only)

PLEASE FOLLOW INSTRUCTIONS ON PAGE FIVE

1. State Building Code to be Amended:


<input type="checkbox"/>	International Building Code	<input checked="" type="checkbox"/>	State Energy Code
<input type="checkbox"/>	International Residential Code	<input type="checkbox"/>	International Mechanical Code
<input type="checkbox"/>	ICC ANSI A117.1 Accessibility Code	<input type="checkbox"/>	International Fuel Gas Code
<input type="checkbox"/>	International Fire Code	<input type="checkbox"/>	NFPA 54 National Fuel Gas Code
<input type="checkbox"/>	Uniform Plumbing Code	<input type="checkbox"/>	NFPA 58 Liquefied Petroleum Gas Code

Section: 2012 IECC Section C402.1.2 **Page:** 20

2. Applicant Name (Specific local government, organization or individual):

Robby Oylear

3. Signed:

	Energy Analyst	March 21, 2012
Proponent	Title	Date

4. Designated Contact Person:

<u>Robby Oylear</u>	<u>Energy Analyst</u>
Name	Title

Address: 1725 Westlake Ave N Ste 300
Seattle, WA 98012

Office Phone: 206-788-4571 **Cell:** 206-354-3289 **Fax:** 206-285-7111

e-mail address: robbyo@rushingco.com

5. Proposed Code Amendment. Use ‘legislative format’ including both old and new language. **See instructions on page five for specific details.** Please use a separate sheet for each separate proposal.

Code: 2012 IECC

Section: C402.1.2

Page: 20

(double underline and double strikethrough are used for proposed modifications)

Amend section to read as follows:

**TABLE C402.1.2
OPAQUE THERMAL ENVELOPE ASSEMBLY REQUIREMENTS^a**

CLIMATE ZONE	1		2		3		4 EXCEPT MARINE		5 AND MARINE 4		6		7		8	
	All other	Group R	All other	Group R	All other	Group R	All other	Group R	All other	Group R	All other	Group R	All other	Group R	All other	Group R
Roofs																
Insulation entirely above deck	U-0.048	U-0.048	U-0.048	U-0.048	U-0.048	U-0.048	U-0.039	U-0.039	U-0.039 U-0.034 <u>0.032</u>	U-0.039 U-0.034 <u>0.026</u>	U-0.032	U-0.032 U-0.034 <u>0.026</u>	U-0.028	U-0.028	U-0.028	U-0.028
Metal buildings	U-0.044	U-0.035	U-0.035	U-0.035	U-0.035	U-0.035	U-0.035	U-0.035	U-0.035 U-0.031	U-0.035 <u>0.031</u>	U-0.031	U-0.031	U-0.029	U-0.029	U-0.029	U-0.029
Attic and other	U-0.027	U-0.027	U-0.027	U-0.027	U-0.027	U-0.027	U-0.027	U-0.027	U-0.027	U-0.024 <u>0.027</u>	U-0.024 <u>0.027</u>	U-0.024 <u>0.027</u>	U-0.021	U-0.021	U-0.021	U-0.021
Walls, Above Grade																
Mass	U-0.142	U-0.142	U-0.142	U-0.123	U-0.110	U-0.104	U-0.104	U-0.090	U-0.078	U-0.078 <u>0.067</u>	U-0.078 <u>0.067</u>	U-0.078 <u>0.059</u>	U-0.061	U-0.061	U-0.061	U-0.061
Metal building	U-0.079	U-0.079	U-0.079	U-0.079	U-0.079	U-0.052	U-0.052	U-0.052	U-0.052	U-0.052	U-0.052	U-0.052 <u>U-0.044</u>	U-0.052	U-0.039	U-0.052	U-0.039
Metal framed	U-0.077	U-0.077	U-0.077	U-0.064	U-0.064	U-0.064	U-0.064	U-0.064	U-0.064	U-0.064 <u>U-0.057</u>	U-0.064	U-0.057 <u>U-0.044</u>	U-0.064	U-0.052	U-0.045	U-0.045
Wood framed and other	U-0.064	U-0.064	U-0.064	U-0.064	U-0.064	U-0.064	U-0.064	U-0.064	U-0.064 <u>U-0.057</u>	U-0.064 <u>U-0.057</u>	U-0.051	U-0.051 <u>U-0.044</u>	U-0.051	U-0.051	U-0.036	U-0.036
Walls, Below Grade																
Below-grade wall ^b	C-1.140	C-1.140	C-1.140	C-1.140	C-1.140	C-1.140	C-0.119	C-0.119	C-0.119 Same as above grade	C-0.119 Same as above grade	C-0.119 Same as above grade	C-0.119 Same as above grade	C-0.092	C-0.092	C-0.092	C-0.092
Floors																
Mass	U-0.322	U-0.322	U-0.107	U-0.087	U-0.076	U-0.076	U-0.076	U-0.074	U-0.074 U-0.029 <u>0.031</u>	U-0.064 U-0.029 <u>0.031</u>	U-0.064 U-0.029 <u>0.031</u>	U-0.057 U-0.029 <u>0.031</u>	U-0.055	U-0.051	U-0.055	U-0.051
Joist/framing	U-0.066	U-0.066	U-0.033	U-0.033	U-0.033	U-0.033	U-0.033	U-0.033	U-0.033	U-0.033	U-0.033	U-0.033	U-0.033	U-0.033	U-0.033	U-0.033

									<u>U-</u> <u>0.029</u> <u>0.040°</u>	<u>U-</u> <u>0.029</u> <u>0.040°</u>	<u>U-</u> <u>0.029</u> <u>0.040°</u>	<u>U-</u> <u>0.029</u> <u>0.040°</u>				
Slab-on-Grade Floors																
Unheated slabs	F-0.73	F-0.73	F-0.73	F-0.73	F-0.73	F-0.73	F-0.54	F-0.54	F-0.54	F-0.54	F-0.54	F-0.52	F-0.40	F-0.40	F-0.40	F-0.40
Heated slabs ^c	F-0.70	F-0.70	F-0.70	F-0.70	F-0.70	F-0.70	F-0.65	F-0.65	F-0.58 <u>F-0.55</u>	F-0.58 <u>F-0.55</u>	F-0.58 <u>F-0.55</u>	F-0.58 <u>F-0.55</u>	F-0.55	F-0.55	F-0.55	F-0.55

Are additional pages attached?

Yes

No

Please note number of additional pages:

5

Supporting Data for Statewide Amendment Proposals. This information is required for all statewide amendment proposals. **Attach supporting documentation, as necessary; incomplete proposals will not be accepted.**

The SBCC requires supporting data on any amendment proposal to show:

1. That it meets basic criteria – See Part I to specify how this proposal meets the criteria for code amendment.
2. The intended effect—See Part II to describe the purpose of the proposed amendment, including the benefits and the problems addressed.
3. The potential impacts or benefits to business—See Part III/Types of Construction, to explain how methods in construction businesses, industries and services would be affected.
4. The potential impact on enforcement procedures, See Part III/Types of Services Required, to provide some analysis of the impacts on code enforcement in local jurisdictions.
5. Economic costs and benefits – Use the Table in Part IV of this form to estimate the costs and benefits of the proposal on construction practices, users and/or the public, the enforcement community, and operation and maintenance.

Part I ♦ Background information on amendment.

Code References:	IECC C402.1.2 & Appendix A	Title:	Opaque Thermal Envelope Assembly Requirements	
Related codes:	n/a	(Does this amendment change other related codes?)		
Proponent:	Robby Oylear	Phone:	206-354-3289	Date: 3/21/2012

NOTE: State-wide and emergency state-wide amendments to the state building code must be based on one of the following criteria; please indicate the pertinent rationale for the proposed amendment by selecting from the list below:

- (1) The amendment is needed to address a critical life/safety need.
- (2) The amendment is needed to address a specific state policy or statute.
- (3) The amendment is needed for consistency with state or federal regulations.
- (4) The amendment is needed to address a unique character of the state.
- (5) The amendment corrects errors and omissions.**

Part II ♦ Amendment Benefit:

PROBLEM(S) ADDRESSED (Describe the intended effect of the proposed code amendment):

Correct errors & omissions.

PRIMARY REASON FOR AMENDMENT: (Describe how the amendment meets one of the criteria listed above)

Table C402.1.2 U-factors do not align with the prescriptive R-values from Table C402.2. The proposed amendments correct the mismatched values to line up with all of the required values from Table C402.2.

TYPE OF BENEFITS PROJECTED:

Enforcement is clarified as the prescriptive R-values will correspond to U-values in Appendix A and the requirements in Table C402.1.2. Additionally, projects will not be penalized for using the U-factor alternative.

Part III ♦ Amendment Impacts or Benefits:

TYPES OF CONSTRUCTION: ☒ New Construction ☐ Alteration/Tenant Improvement/Repair
☐ Residential-Single Family ☒ Residential-Multi Family ☒ Commercial ☒ Industrial

List businesses/industries affected by amendment:

Manufacturers:	N/A
Specific Construction Contractors & Trades:	N/A
Construction Supply Industry:	N/A
Specialty Trades:	N/A
Types of Buildings:	All buildings governed under section C402.

Fire Protection Industry:

N/A

TYPES OF SERVICES REQUIRED:

☐ **Reporting.** Brief Description:

☐ **Record Keeping.** Brief Description:

☐ **Other.** Brief Description:

☒ **Indirect Cost to Industry.** Indicate whether there are multiple sources to obtain the equipment, material or service required by this proposal. If not, provide a justification of the benefit versus small business impact.

Part IV ♦ Amendment Costs and Benefits

Building Type	Construction ¹			Enforcement ²			Operations & Maintenance ³		
	Costs	% impact ⁴	Benefits ⁵	Costs	% impact	Benefits	Costs	% impact	Benefits
Residential	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Single family	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Multi-family	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Commercial/Retail	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Industrial	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Institutional	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

¹ \$ / square foot of floor area or other cost. Attach data. **Construction** costs are costs prior to occupancy, and include both design and direct construction costs that impact the total cost of the construction to the owner/consumer.

² Cost per project plan. Attach data. **Enforcement** costs include governmental review of plans, field inspection, and mediated litigation required for enforcement.

³ Cost to building owner/tenants over the life of the project.

⁴ Cost differential over a specific size project or range of projects as determined by the proponent. Provide sufficient cost and benefit detail to clarify the impact to the Council. All data should be created and referenced to third party reputable sources for verification.

⁵ Note sectors with measurable benefit from Part II, including benefits to a) the user, b) the public, c) the industry, and/or d) the economy; use e) for all of the above.

GENERAL INSTRUCTIONS FOR MAKING A CODE CHANGE PROPOSAL:

1. Check the boxes for the code or codes for which amendments are being proposed.
2. Provide the name of the local government, organization, or individual proposing the code change.
3. Proponent must sign and date the proposal as noted.
4. Provide contact information for the person designated to work with the Council and staff to supply information on the proposed changes as needed; please include name, address, phone number and e-mail address.
5. The specific section for which an amendment is proposed should be listed. The **entire section** should be reproduced, including the existing and the proposed amendatory language.

This must be prepared in legislative style formatting. Specifically, all added words should be underlined; all deleted words should be struck through. Any separate new sections added should be inserted in the appropriate place in the existing code language in order to continue the established numbering system of the code. If more than one section is proposed for amendment or more than one page is needed for reproducing the affected section of the code, additional pages may be attached.

6. **SUPPORTING DATA REQUIREMENTS FOR ALL STATEWIDE AMENDMENT PROPOSALS:** You must attach background information with all statewide amendment proposals. The attached worksheet provides requirements for supporting data. All information will be forwarded to the Council as part of the amendment's documentation. TAG findings and projections from the worksheet will be tabulated to summarize projected benefits and impacts and will be included with TAG comments and recommendations. SBCC staff may request additional information as needed to clarify any potential impacts, and may perform additional research and analysis as needed when requested by the Council or the Standing Committee.
7. Please send an electronic copy of your completed proposal to SBCC staff at:
sbcc@ga.wa.gov

NOTE: YOU MAY REPRODUCE THIS FORM AND ADD ADDITIONAL PAGES AS NEEDED.

A107.2.6 Roofs with Insulation Entirely Above Deck (uninterrupted by framing), Table A107.2.6: The base assembly is continuous insulation over a structural deck. Added insulation is continuous and uninterrupted by framing. For the insulation, the first column lists the R-value for continuous insulation with a uniform thickness; the second column lists the comparable area-weighted average R-value for continuous insulation provided that the insulation thickness is never less than R-5 (except at roof drains) and that the slope is no greater than 1/4 inch per foot.

**TABLE A107.2.6
ASSEMBLY U-FACTORS FOR ROOFS WITH INSULATION ENTIRELY ABOVE DECK
(UNINTERRUPTED BY FRAMING)**

Rated R-Value of Insulation Alone: Minimum Throughout, Unsloped	Rated R-Value of Insulation Alone: Average (R-5 minimum), Sloped (1/4 inch per foot maximum)	Overall U-Factor for Entire Assembly
R-0	Not Allowed	U-1.282
R-1	Not Allowed	U-0.562
R-2	Not Allowed	U-0.360
R-3	Not Allowed	U-0.265
R-4	Not Allowed	U-0.209
R-5	Not Allowed	U-0.173
R-6	R-7	U-0.147
R-7	R-8	U-0.129
R-8	R-9	U-0.114
R-9	R-10	U-0.102
R-10	R-12	U-0.093
R-11	R-13	U-0.085
R-12	R-15	U-0.078
R-13	R-16	U-0.073
R-14	R-18	U-0.068
R-15	R-20	U-0.063
R-16	R-22	U-0.060
R-17	R-23	U-0.056
R-18	R-25	U-0.053
R-19	R-27	U-0.051
R-20	R-29	U-0.048
R-21	R-31	U-0.046
R-22	R-33	U-0.044
R-23	R-35	U-0.042
R-24	R-37	U-0.040
R-25	R-39	U-0.039
R-26	R-41	U-0.037
R-27	R-43	U-0.036
R-28	R-46	U-0.035
R-29	R-48	U-0.034
R-30	R-50	U-0.032
R-35	R-61	U-0.028
R-40	R-73	U-0.025
R-45	R-86	U-0.022
R-50	R-99	U-0.020
R-55	R-112	U-0.018
R-60	R-126	U-0.016

Table reference for Insulation entirely above deck

Climate Zone 5 & Marine 4 All Other

Climate Zone 4C-6 Group R (interpolate)

U=0.026 (interpolated)

SECTION A107 -- CEILINGS

A107.1 General: Table A107.1 lists heat loss coefficients for the opaque portion of exterior ceilings below vented attics, vaulted ceilings and roof decks in units of Btu/h•ft²•°F of ceiling.

They are derived from procedures listed in the ASHRAE Fundamentals Handbook. Ceiling U-factors are modified for the buffering effect of the attic, assuming an indoor temperature of 65°F and an outdoor temperature of 45°F.

A107.1.1 Metal Framed Ceilings: The nominal R-values in Table A105.3.6.2: Effective R-Values for Metal Framing and Cavity Only may be used for purposes of calculating metal framed ceiling section U-factors in lieu of the ASHRAE zone calculation method as provided in Chapter 27 of the ASHRAE Fundamentals Handbook.

Metal building roofs have a different construction and are addressed in Table A107.2.5.

TABLE A107.1
DEFAULT U-FACTORS FOR CEILINGS

Table reference for
Attic and other

	Standard Frame	Advanced Frame
Ceilings Below Vented Attics		
Flat	Baffled	
R-19	0.049	0.047
R-30	0.036	0.032
R-38	0.031	0.026
R-49	0.027	0.020
R-60	0.025	0.017
Scissors Truss		
R-30 (4/12 roof pitch)	0.043	0.031
R-38 (4/12 roof pitch)	0.040	0.025
R-49 (4/12 roof pitch)	0.038	0.020
R-30 (5/12 roof pitch)	0.039	0.032
R-38 (5/12 roof pitch)	0.035	0.026
R-49 (5/12 roof pitch)	0.032	0.020
Vaulted Ceilings	16" O.C.	24" O.C.
Vented		
R-19 2x10 joist	0.049	0.048
R-30 2x12 joist	0.034	0.033
R-38 2x14 joist	0.027	0.027
Unvented		
R-30 2x10 joist	0.034	0.033
R-38 2x12 joist	0.029	0.027
R-21 + R-21 2x12 joist	0.026	0.025
Roof Deck	4x Beams, 48" O.C.	
R-12.5 2" Rigid insulation	0.064	
R-21.9 3.5" Rigid insulation	0.040	
R-37.5 6" Rigid insulation	0.025	
R-50 8" Rigid insulation	0.019	

Climate
Zone 4
Except
Marine
Climate
Zone
4C-6



ALTERNATIVE TO MODIFYING ATTIC & OTHER ENTRY IN
TABLE C402.1.2:

REPLACE TABLE A107.1 WITH THE FOLLOWING
(SOURCE: ASHRAE 90.1-2007):

TABLE A107.1
DEFAULT U-FACTORS FOR CEILINGS

Rated R-Value of Insulation Alone	Overall U-Factor for Entire Assembly
Wood-Framed Attic, Standard Framing	
None	U-0.613
R-11	U-0.091
R-13	U-0.081
R-19	U-0.053
R-30	U-0.034
→ R-38	U-0.027
→ R-49	U-0.021
R-60	U-0.017
R-71	U-0.015
R-82	U-0.013
R-93	U-0.011
R-104	U-0.010
R-115	U-0.009
R-126	U-0.008
Wood-Framed Attic, Advanced Framing	
None	U-0.613
R-11	U-0.088
R-13	U-0.078
R-19	U-0.051
R-30	U-0.032
R-38	U-0.026
R-49	U-0.020
R-60	U-0.016
R-71	U-0.014
R-82	U-0.012
R-93	U-0.011
R-104	U-0.010
R-115	U-0.009
R-126	U-0.008
Wood Joists, Single-rafter Roof	
None	U-0.417
R-11	U-0.088
R-13	U-0.078
R-15	U-0.071
R-19	U-0.055
R-21	U-0.052
R-25	U-0.043
R-30	U-0.036
R-38	U-0.028

Values agree with Table
C402.1.2

TABLE A3.1A Assembly U-Factors for Above-Grade Concrete Walls and Masonry Walls (continued)

Framing Type and Depth	Rated R-Value of Insulation Alone	Assembly U-Factors for 8 in. Normal Weight 145 lb/ft ³ Solid Concrete Walls	Assembly U-Factors for 8 in. Medium Weight 115 lb/ft ³ Concrete Block Walls: Solid Grouted	Assembly U-Factors for 8 in. Medium Weight 115 lb/ft ³ Concrete Block Walls: Partially Grouted (Cores Uninsulated Except Where Specified)
No Framing	R-0	U-0.740	U-0.580	U-0.480
No Framing	Ungrouted Cores Filled with Loose-Fill Insulation	N/A	N/A	U-0.350
1 in. Metal Clips at 24 in. on Center Horizontally and 16 in. Vertically (continued)				
5.0 in.	R-28.0	U-0.046	U-0.046	U-0.045
6.0 in.	R-33.6	U-0.039	U-0.039	U-0.038
7.0 in.	R-39.2	U-0.034	U-0.034	U-0.033
8.0 in.	R-44.8	U-0.030	U-0.030	U-0.029
9.0 in.	R-50.4	U-0.027	U-0.027	U-0.026
10.0 in.	R-56.0	U-0.024	U-0.024	U-0.024
11.0 in.	R-61.6	U-0.022	U-0.022	U-0.022
Continuous Insulation Uninterrupted by Framing				
No framing	R-1.0	U-0.425	U-0.367	U-0.324
No framing	R-2.0	U-0.298	U-0.269	U-0.245
No framing	R-3.0	U-0.230	U-0.212	U-0.197
No framing	R-4.0	U-0.187	U-0.175	U-0.164
No framing	R-5.0	U-0.157	U-0.149	U-0.141
No framing	R-6.0	U-0.136	U-0.129	U-0.124
No framing	R-7.0	U-0.120	U-0.115	U-0.110
No framing	R-8.0	U-0.107	U-0.103	U-0.099
No framing	R-9.0	U-0.097	U-0.093	U-0.090
No framing	R-10.0	U-0.088	U-0.085	U-0.083
No framing	R-11.0	U-0.081	U-0.079	U-0.076
No framing	R-12.0	U-0.075	U-0.073	U-0.071
No framing	R-13.0	U-0.070	U-0.068	U-0.066
No framing	R-14.0	U-0.065	U-0.064	U-0.062
No framing	R-15.0	U-0.061	U-0.060	U-0.059
No framing	R-16.0	U-0.058	U-0.056	U-0.055
No framing	R-17.0	U-0.054	U-0.053	U-0.052
No framing	R-18.0	U-0.052	U-0.051	U-0.050
No framing	R-19.0	U-0.049	U-0.048	U-0.047
No framing	R-20.0	U-0.047	U-0.046	U-0.045
No framing	R-21.0	U-0.045	U-0.044	U-0.043
No framing	R-22.0	U-0.043	U-0.042	U-0.042
No framing	R-23.0	U-0.041	U-0.040	U-0.040
No framing	R-24.0	U-0.039	U-0.039	U-0.038
No framing	R-25.0	U-0.038	U-0.037	U-0.037
No framing	R-30.0	U-0.032	U-0.032	U-0.031
No framing	R-35.0	U-0.028	U-0.027	U-0.027
No framing	R-40.0	U-0.024	U-0.024	U-0.024
No framing	R-45.0	U-0.022	U-0.021	U-0.021
No framing	R-50.0	U-0.019	U-0.019	U-0.019
No framing	R-55.0	U-0.018	U-0.018	U-0.018
No framing	R-60.0	U-0.016	U-0.016	U-0.016

Values interpolated per R-values in C402.2

Table reference for
Exposed Floors

TABLE A104.1(3)
DEFAULT U-FACTORS FOR EXPOSED FLOORS

Climate Zone
4C-6
Mass &
Joist/framing



Nominal U-factor			
R-value	Concrete	Wood Joist	Metal Joist
R-11	0.077	0.088	0.14
R-15	0.059	0.076	0.12
R-19	0.048	0.062	0.11
R-21	0.043	0.057	0.11
R-25	0.037	0.051	0.10
R-30	0.031	0.040	0.09
R-38	0.025	0.034	0.08

SECTION A105 — ABOVE-GRADE WALLS

A105.1 General: Table A105.1(1), A105.1(2) and A105.1(3) list heat loss coefficients for the opaque portion of above-grade wood stud frame walls, metal stud frame walls and concrete masonry walls (Btu/h•ft²•°F) respectively. They are derived from procedures listed in the ASHRAE Fundamentals Handbook. For intermediate floor slabs which penetrate the insulated wall, use the concrete wall U-factors in Table A105.1(2).

Insulation is assumed to uniformly fill the entire cavity and to be installed as per manufacturer's directions. All walls are assumed to be finished on the inside with 1/2 inch gypsum wallboard, and on the outside with either beveled wood siding over 1/2 inch plywood sheathing or with 5/8 inch T1-11 siding. Insulated sheathing (either interior or exterior) is assumed to cover the entire opaque wall surface, except where modified in accordance with footnote h to Table 402.1.1.

Metal building walls have a different construction and are addressed in Table A-5A(3).

A105.2 Framing Description: For wood stud frame walls, three framing types are considered and defined as follows:

A105.2.1 Standard: Studs framed on 16 inch centers with double top plate and single bottom plate. Corners use three studs and each opening is framed using two studs. Headers consist of double 2x or single 4x material with an air space left between the header and the exterior sheathing. Interior partition wall/exterior wall intersections use two studs in the exterior wall.

Standard framing weighting factors:

Studs and plates	0.19
Insulated cavity	0.77
Headers	0.04

A105.2.2 Intermediate: Studs framed on 16 inch centers with double top plate and single bottom plate. Corners use two studs or other means of fully insulating corners, and each opening is framed by two studs. Headers consist of double 2x material with R-10 insulation. Interior partition wall/exterior wall intersections are fully insulated in the exterior wall.

Intermediate framing weighting factors:

Studs and plates	0.18
Insulated cavity	0.78
Headers	0.04

A105.2.3 Advanced: Studs framed on 24 inch centers with double top plate and single bottom plate. Corners use two studs or other means of fully insulating corners, and one stud is used to support each header. Headers consist of double 2x material with R-10 insulation. Interior partition wall/exterior wall intersections are fully insulated in the exterior wall.

Advanced Framing Weighting Factors:

Studs and plates	0.13
Insulated cavity	0.83
Headers	0.04